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CROP GENETICS & PRODUCTION  
RESEARCH UNIT

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## UNITED STATES DEPARTMENT OF AGRICULTURE

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Mid South Area

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## **CROP GENETICS & PRODUCTION RESEARCH UNIT, STONEVILLE, MS**

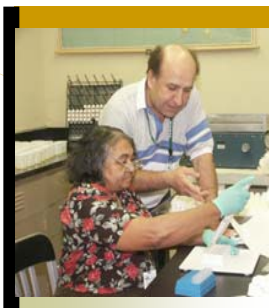
The Crop Genetics & Production Research Unit scientists use genetics and other disciplines such as plant physiology and pathology to improve the yield, quality and host plant resistance to pests and stresses of corn, cotton and soybean. We use molecular and conventional techniques to accomplish our goal of furnishing new knowledge and products that will enable agricultural producers to feed and clothe America and the world.

### **The mission of the Crop Genetics and Production Research Unit is to:**

- (1) develop knowledge about the biology of the corn, cotton, and soybean plants and their genetic, physiological, and pest resistance interactions with the environment;
- (2) discover heritable plant characteristics that confer resistance or tolerance to adverse environmental pressures including pests and diseases;
- (3) develop genetic and production management systems that improve the productivity and grower profitability of corn, cotton, and soybeans;
- (4) coordinate the National Cotton Variety Tests and the Uniform Soybean Tests for the southern U.S.;
- (5) maintain and evaluate a soybean germplasm collection;
- (6) release improved germplasm and varieties, and use this knowledge and new germplasm to enhance production and improve the environment.

## **CORN RESEARCH**

Corn has become a major crop in the mid South, because of its importance in crop rotation with cotton and soybeans, and also for its great demand by both catfish and poultry producers in this area for locally grown grain. However, corn production here is hindered by very potent toxins including aflatoxin and fumonisins, since the weather conditions in the area are favorable for producing these toxins. The mission of the mycotoxin project is to reduce or eliminate toxin contamination in corn grain while maximizing and enhancing yield and quality of the crop. Research on biological control of aflatoxin in corn uses non-toxigenic strains to reduce the levels of aflatoxin by 60% to 86%. Research on hybrid testing in several southern states is discovering tolerance in some hybrids to aflatoxin contamination. Research on finding genes that impart resistant to insects and aflatoxin is also showing promise.



## **COTTON RESEARCH**



To remain viable in a competitive global market, U.S. cotton must be high yielding with superior quality. At the same time, input costs for the grower must be minimized to give the greatest return for the dollar. Unit scientists are working to determine mechanisms responsible for cotton fiber development and how they could be modified to improve fiber quality. Scientists are also transferring desirable fiber characters and pest resistance traits from primitive cotton and wild relatives into adapted lines that can be used in public and private breeding programs. Other members of the unit are developing more cost effective cropping systems and finding ways to reduce damage caused by nematodes.

## **SOYBEAN RESEARCH**

Soybean research at Stoneville has a long and productive history, from the important work of ARS Hall of Fame scientist Dr. E. E. Hartwig in developing varieties for southern soybean production, to the revolutionary work of Dr. Larry Heatherly in developing and implementing the Early Soybean Production System. Other critical areas of past research included long-term nematode research by Dr. Lawrence Young and developing new sources of disease resistance by Dr. Tom Kilen. A new generation of soybean scientists continues in this tradition, with the addition of molecular analysis capabilities. Currently, soybean research projects focus



on developing varieties with enhanced capabilities for resisting the adverse effects of abiotic and biotic stresses. Research areas include enhancing drought tolerant nitrogen fixation, improving seed quality and yield, epidemiological/ecological studies of diseases and nematodes,

and economic-based management strategies. Techniques employed include molecular identification of genes, classical genetics, pathological protocols, agronomy, molecular mapping, and plant breeding.

### **Additional Research Unit Information:**

Research at Jackson, TN site: scientists at this work site concentrate on genetic control of the soybean cyst, plus research is being initiated on foliar diseases of soybean.

**Variety Testing Programs:** Dr. Bill Meredith coordinates a 14-state effort to evaluate promising cotton breeding lines and varieties for their yield and fiber quality; the unit coordinates a program for testing public soybean breeding lines for their potential as varieties in 17 southern states.